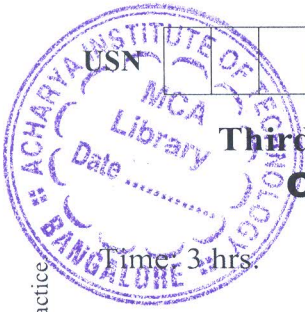**18MT36**

Third Semester B.E. Degree Examination, July/August 2021
Computer Organization and Architecture

Time: 3 hrs.

Max. Marks:100

Note: *Answer any FIVE full questions.*

1 a. Explain the basic operational concepts of the computer with a neat diagram. **(06 Marks)**
   b. Write the basic performance equation. Explain the role of each of the parameters in the equation on the performance of the computer. **(06 Marks)**
   c. What is byte addressability? Discuss Big-Endian and Little-Endian assignment with necessary figure and example. **(08 Marks)**

2 a. Explain the different functional units of a computer with a neat block diagram. **(08 Marks)**
   b. Describe basic instruction types with example. **(06 Marks)**
   c. What is straight line sequencing? Illustrate with an example. **(06 Marks)**

3 a. Define addressing mode. Explain the following addressing modes with example. Direct, indirect and index. **(08 Marks)**
   b. What are assembler directives? Point out and explain the various directives with example. **(08 Marks)**
   c. Demonstrate the operation of any two rotate instruction with example. **(04 Marks)**

4 a. What is subroutine? How to pass parameters to subroutines? Illustrate with an example. **(08 Marks)**
   b. What is stack? Write routine for performing safe push and pop operation. **(08 Marks)**
   c. Write short note on execution of assembly language. **(04 Marks)**

5 a. What is an interrupt? Explain the implementation of interrupt request line with a neat diagram. **(06 Marks)**
   b. What is interrupt nesting? Demonstrate the implementation of interrupt priority using individual interrupt request and acknowledge lines. **(08 Marks)**
   c. Summarize the operation of controlling device requests with an example. **(06 Marks)**

6 a. Write a note on memory mapped I/O. **(04 Marks)**
   b. State DMA method. Write a note on registers in a DMA interface. **(08 Marks)**
   c. With a neat diagram, discuss the working of daisy chain and arrangement of priority groups in detail. **(08 Marks)**

7 a. With a neat diagram, illustrate the internal organization of 16×8 memory chip. **(08 Marks)**
   b. Give implementation of static RAM memory cell. Discuss its read and write operation. **(06 Marks)**
   c. Define ROM. Point out and describe various types of ROMs. **(06 Marks)**

8 a. Draw the organization of $1K \times 1$ memory chip and explain its working. **(06 Marks)**
   b. With a neat diagram, describe the organization of $2m \times 8$ dynamic memory chip. **(08 Marks)**
   c. What is virtual memory? How virtual memory address is translated to physical address? **(06 Marks)**

9 a. Draw and explain single bus organization of a processor. Write the control sequence for the execution of an instruction add (R_3), R_1, **(10 Marks)**

   b. Explain with block diagrams the organization of micro programmed control unit.   **(10 Marks)**

10 a. With a neat diagram, discuss 3 bus organization and write control sequence for the instruction Add R_4, R_5, R_6. **(10 Marks)**

   b. Demonstrate the organization of hard wired control unit with neat block diagrams. **(10 Marks)**

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